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Nikagmiller

6/28/01

Date

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of :

Tsang et al. :

Application No: 09/185,243 : Group Art Unit: 1633

Filed: November 3, 1998 : Examiner: Janet M. Kerr

Title: HYPERTHERMIC INDUCIBLE EXPRESSION VECTORS FOR GENE
THERAPY AND METHODS OF USE THEREOF

Box AF
Commissioner for Patents
Washington, DC 20231

DECLARATION OF DAVID T. HARRIS UNDER 37 C.F.R. § 1.132

Assistant Commissioner for Patents
Washington, D.C. 20231

Dear Sir:

I, David T. Harris, Ph.D., hereby declare as follows:

1. I am a Professor of Microbiology and Immunology at the University of Arizona and coinventor of the subject application, filed November 3, 1998. I consider myself to be skilled in the art of molecular biology, including expression vector cloning. My *curriculum vitae* is appended hereto (Exhibit A).

2. Bromley *et al.* (EP 0299127 A1; published January 18, 1989) claim a method of producing proteins encoded by genes of interest placed under the expression control of a promoter regulated by an endogenous activation factor, in which “hybrid genes” are carried by two independent or only one transfer vector. Although Bromley *et al.* claim a single transfer vector with hybrid genes, they have presented no disclosure that suggests that Bromley *et al.* knew how to construct such a dual gene vector. In the Summary Of The Invention, Bromley *et al.* state that the hybrid genes can be part of one or separate vectors whereby incorporation into host cells is carried out by transfection or co-transfection. However, no guidance is provided as to how to achieve the construction of the dual gene vector or transfection of the same. In the examples, Bromley *et al.* describe how to construct plasmids, each of which contains a gene under the control of a promoter (a cat gene under the control of the HIV-LTR; a tat-III gene under the control of the hsp70 promoter; a hsp70-cat fusion gene; a hGH gene under the control of HIV-LTR; a hGH gene under the control of the hsp70 promoter; and a hGH gene with the hsp70 and the LTR promoters), and how to co-transfect some of these plasmids into cells. No discussion is provided of how to either construct or transfect a dual gene vector, such as a vector that contains both the gene of interest (*e.g.*, cat, hGH) and the transactivator (tat) as

described in our invention. Bromley *et al.* assay for LTR-cat and hGH expression. Tables 1, 2, and 3 monitor the expression of the gene of interest (cat, hGH). As is clearly shown in the text and the tables (see Detailed Description Of The Invention and Examples, pages 5-9), the gene of interest and tat are always carried on separate vectors. There is no teaching of how to clone a dual gene vector such as the one taught in our application, where the gene of interest and tat are carried on the same vector.

On information and belief, even 10 years after Bromley *et al.* had filed EP 0299127 A1, they had not yet constructed a single DNA vector with “hybrid genes”.

3. As shown by the evidence attached hereto (*i.e.*, publication, *infra*) and discussed below, our laboratory has successfully created the dual gene amplifier vectors of the subject application and diligently taught how to construct these vectors (see pages 62-68 of the specification). We were also the first to publish the dual gene amplifier vectors (Tsang *et al.* 2000 International Journal of Molecular Medicine 5:295-300; attached hereto as Exhibit B). Factors such as the size of the vector, whether to use the HIV 1 LTR or the HIV 2 LTR, the effects of adding more than one transcription unit to the same vector, and the relative orientation of the transcription units were factors taken into consideration when constructing the amplifier vector. In order to create a dual gene expression vector that contained both a transcriptional unit encoding a transcription factor and a second transcriptional unit that was amplified by the transcription factor we had to develop a sophisticated strategy. This type of vector construction involved much more

than ligating transcriptional units together. The main factors needed to be considered were the following:

i) Where to position the transcriptional units to cause the least amount of transcriptional interference between the different promoters, while maximizing the effects of transcriptional run-through to obtain highest levels of expression.

ii) Whether the juxtaposition of the promoters would cause them to compete for the limited endogenous cellular transcription factors which may reduce the overall levels of transcription.

iii) Whether the additional transcription unit will cause the size of the expression vector to become too large, thus, leading to inefficient expression or transfection.

Other factors, such as whether to use the HIV 1 LTR or the HIV 2 LTR as well as the correct relative orientation of the transcription units, were also unknown prior to the actual construction and testing of our constructs. By constructing ten different dual gene expression vectors using various combinations of the components in the transcriptional units, we have shown that the HIV 2 promoter-based amplifier constructs produced 28 times more secreted IL-2 than the CMV promoter control. Their levels of expression were approximately three times higher than those obtained with the HIV 1 promoter-based amplifier constructs. Our data also showed that the augmented activity of the amplifier constructs is dependent on the presence of the tat gene. The addition of the SV40 promoter and the resulting 2.0 kb increase in size did not reduce the overall levels of expression, rather the levels of expression significantly increased. Finally, placing the

transcriptional units in the "wrong" orientation completely abolished the augmented expression, providing further support that our vectors are constructed according to a specific strategy (*supra*) and any small alteration may lead to entirely different results.

4. The heat inducible expression vectors of the subject application show unexpectedly high levels of gene expression. The vectors f12 and 007 shown in Table 4 (page 66 of the specification and shown below) were derived by modifying vectors X14 and Y15 shown in Table 3 (page 63 of the specification and shown below). Tables 3 and 4 demonstrate that the vectors f12, 007, X14 and Y15 produce higher levels of gene expression than any expression vector reported to date. As shown in the Tables, their gene expression is significantly higher than the current standard, the CMV promoter (L27). For example, Table 4 shows that transfection of MCF7 cells with the f12 plasmid increased IL-2 expression by as much as 26-fold, compared to the CMV driven control, L-27.

To my knowledge, there are no other vectors currently available that can reach the levels of expression achieved by f12, 007, X14 and Y15 at any temperature. It is important to note that the use of expression vectors in cytokine-mediated gene therapy (*e.g.*, IL-2) requires extremely high levels of cytokine gene expression in order to be clinically effective. Thus, one must achieve a therapeutic threshold for this approach to work. The high levels of expression obtained with our vectors are unique in this aspect and their construction is clearly novel and non-obvious with respect to existing prior art.

| TABLE 3 | | |
|---------------------|---------------------------|-------------------------------|
| Plasmid Name | Promoter/gene | Amount of IL-2 in I.U. |
| Lipid alone | Dosper | .48 |
| L-27 | CMV/IL-2 | 15.63 |
| RR13 | HIV1/IL-2 | 17.56 |
| | CMV/multiple cloning site | |
| X14 | HIV1/IL-2 | 173.7 |
| | CMV/TAT | |
| SS10 | HIV2/IL-2 | 12.83 |
| | CMV/multiple cloning site | |
| Y15 | HIV2/IL-2 | 440.55 |
| | CMV/TAT | |

| TABLE 4 | | | | | |
|-----------------------------|---------------------|-------------------|---------------|---------------|---------------|
| | I.U. of IL-2 | | | | |
| temperature: | 37°C | 39°C | 41°C | 42°C | 44°C |
| heat shock duration: | continuous | continuous | 1 hr | 1hr | 0.5 hr |
| Lipid alone | 2.03 | 0.50 | 0.41 | 0.53 | 0.53 |
| L-27 | 14.28 | 9.88 | 5.95 | 9.88 | 7.80 |
| 007 | 336.76 | 318.49 | 334.02 | 373.74 | 389.27 |
| F12 | 78.40 | 106.88 | 149.93 | 230.02 | 188.13 |
| C8 | 9.19 | 8.03 | 11.74 | 8.73 | 16.37 |

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18

of the United States Code and that such willful false statements may jeopardize the validity of the above identified application or any patent issued thereon.

So declared,

David T. Harris 6/26/01
David T. Harris Date

Serial No. 09/185,243
Docket No. 15907-0016

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CURRICULUM VITAE**DAVID T. HARRIS, PH.D****CHRONOLOGY OF EDUCATION****1980-1982**

Doctor of Philosophy (magna cum laude)
Microbiology and Immunology
Bowman Gray School of Medicine
Wake Forest University
Winston-Salem, NC
"Modification of Susceptibility to Immune Cytolysis by
Specific Alterations in Target Cell Phospholipid
Composition"
Dissertation Director : Raymond E. Kuhn, Ph.D.

1978-1979

Master of Science (summa cum laude)
Medical Sciences
Bowman Gray School of Medicine
Wake Forest University
Winston-Salem, NC
"Spontaneous Hypertension in the Rat and Its Effects
Upon the Auditory System"
Thesis Advisor: James G. McCormick, Ph.D.

1974-1978

Bachelor of Science in Biology
(cum laude)
Bachelor of Science in Mathematics
(cum laude)
Bachelor of Science in Psychology
(cum laude)
Wake Forest University
Winston-Salem, NC

EMPLOYMENT**1996-Present**

Professor of Immunology
Dept. Microbiology & Immunology
University of Arizona

1989-Present

Associate Professor
Dept. Microbiology & Immunology
University of Arizona
(tenure granted on 7/1/92)

1992-Present

Director
Cord Blood Stem Cell Bank
University of Arizona

1993-Present

Member
Arizona Cancer Center
University of Arizona

1993-Present **Member**
Steele Memorial Children's Research Center
University of Arizona

1990-Present **Associate Member**
Clinical Scientist
Arizona Arthritis Center
University of Arizona

1985-1989 **Research Assistant Professor**
Center for Environmental Medicine
and Lung Biology
Dept. of Medicine
University of North Carolina-Chapel Hill
Chapel Hill, N.C.

1985 (6 months) **Staff Immunologist**
Environmental Monitoring & Services, Inc.
Chapel Hill, N.C.

1982-1985 **Post-doctoral Fellow (Mentor: J.C. Cerottini)**
Ludwig Institute for Cancer Research
Lausanne, Switzerland

HONORS AND AWARDS

1986 **Awarded Travel Grant by the American Association of Immunology,**
to attend the Sixth International Congress of Immunology,
Toronto, Canada

1987 **Finalist, Outstanding Young Investigator,**
Reticuloendothelial Society

1991 **Undergraduate Research Award received by Jeffrey LoCascio**
(student in my laboratory) at the local American Society for
Microbiology (ASM).

1992 **Awarded University of Arizona International Travel Grant to attend the**
International Congress of Immunology, Budapest, Hungary

1992 **Elected to Sigma Xi, National Scientific Honor Society**

1997 **Granted, 1 year Sabbatical**
Bone Marrow Transplant training with Dr. Michael Graham
Stem Cell Training with Ribozyme Pharmaceuticals

1997 **Advisory Board, Canadian Journal of Clinical Medicine**

1998-1999 **Chosen as the US Air Force #1 Research Project**

1998 **1st Prize for Best Lecture, 1st GCC Blood Transfusion Conference (U.A.E.)**

1998 **Faculty Reviewer, Univ. of Nebraska Medical Center**

1977-1978 **Member, Beta Beta Beta, Biological Honor Society**

1982-1985 **Fellow, Ludwig Institute for Cancer Research**

1993 **Elected to "Who's Who in the West"**

1994 **Elected to American Men and Women in Science**

1995 **Elected to "Who's Who in the West"**

| | |
|-----------|---|
| 1995 | Elected to "Who's Who in America" |
| 1995 | Elected to "Who's Who Worldwid " |
| 1997 | Elected to "Who's Who in America" |
| 1997 | Elected to "Who's Who in Medicine and Healthcare" |
| 1997 | Elected to "Who's Who in the West" |
| 1997 | Elected to "American Men and Women in Science" |
| 1998 | Elected to "Who's Who in the West" |
| 1998 | Elected to "Who's Who in America" |
| 1998 | Elected to "Who's Who in the World" |
| 1998 | Elected to "Who's Who in Science and Engineering" |
| 1998 | Elected to "Who's Who in Medicine and Healthcare" |
| 1999-2000 | Elected to "Who's Who in Medicine and Healthcare" |
| 1999 | Elected to "Who's Who in America" |
| 1999 | Elected to "Who's Who in the West" |
| 2000-2001 | Elected to "Who's Who in the West" |
| 2000 | Elected to "Who's Who in America" |
| 2000 | Elected to "Who's Who in the World" |
| 2000-2001 | Elected to "Who's Who in Medicine and Healthcare" |
| 2001 | Elected to "Who's Who in America" |
| 2002 | Elected to "Who's Who in America" |

SOCIETY MEMBERSHIP

The American Association of Immunology (1989-present)
 International Society for Hematotherapy & Graft Engineering (1994-present)
 AABB (1997-present)
 American Society of Gene Therapy (1998-present)
 The Reticuloendothelial Society (1987-present)
 The American Association for the Advancement of Science (AAAS) (1990-present)
 The International Society of Developmental and Comparative Immunology (1990-present)
 The Scandanavian Society for Immunology (1990-present)
 The Arizona Branch of the American Society for Microbiology (1991-present)
 European Society of Gene Therapy (2000-present)
 Gene Therapy and Molecular Biology Society (1998-present)
 Tissue Engineering Society International (2000-present)

INTRAMURAL SERVICE

Departmental Committees:

Member, Dept. of Microbiology & Immunology, Graduate Program Revisions Committee, 1989-1993.
 Member, Dept. of Microbiology & Immunology, Graduate Education Program Committee, 1990-1993.
 Member, Dept. of Microbiology & Immunology, Executive Committee, 1990-1993.
 Chairman, Dept. of Microbiology & Immunology, Executive Committee, 1990-1993.
 Chairman, Dept. of Microbiology & Immunology, Graduate Program, 1990-1993.
 Member, Dept. of Microbiology & Immunology, Merit & Evaluation Committee, 1993-1997
 Member, Dept. of Microbiology & Immunology, Promotion & Tenure Committee, 1997-1998-1999
 Member, Dept. of Microbiology & Immunology, Search Committee, 1999
 Member, Dept. Microbiology & Immunology, Training Grant Committee, 2000

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Member, Dept. Microbiology & Immunology, Human Subjects Protection Committee, 2000

4

College Committees:

Ad-Hoc Interviewer, Dept. of Pharmacology & Toxicology, 1990.
 Ad-Hoc Interviewer, Dept. of Pathology, 1990.
 Interviewer, Medical School Admissions, 1990-present.
 Ad-Hoc Interviewer, Dept. of Pediatrics, Nephrology Search Committee, 1991.
 Ad-Hoc Interviewer for Rheumatology Search, October 1991.
 Member, College of Medicine, Honors and Awards Committee (1992-1993)
 Member, Search Committee for HIV Clinical Director, 1994
 Member, Medical Student Appeals Committee, 1995-1996
 Member, Medical Student Appeals Committee, 1996-1997
 Member, Medical Student Appeals Committee, 1997-1998
 Member, Medical Student Appeals Committee, 1998-1999
 Member, Medical Student Appeals Committee, 1999-2000
 Member, Arizona Cancer Center Immunobiology Program, 1998-present

University Committees:

Member, University Biotechnology Committee for Flow Cytometry, 1990-present.
 Departmental Representative, National Science and Technology Week for Tucson area high school students, 1990.
 University Representative from the Howard Hughes Undergraduate Biology Research Program to Board of Regents, University of Arizona, 1991.
 Member, University Committee on Graduate Studies, Fall 1991-present.
 Participant, University Honors Program, Student/Faculty Dialogue Discussions, 1991-present.
 Grader, University of Arizona Undergraduate Writing Proficiency (UDWPE) Composition Exam, 1991-present.
 Member, Institutional Animal Care and Use Committee (IACUC), 1992-1995
 Mentor, Undergraduate Honors Program, 1992-present
 Participant, University Biotechnology Outreach Program, 1993.
 Lecturer, Undergraduate Biology Honors Program, September 1996, Cord Blood Banking and Transplantation
 Lecturer, Honors Program, Dept. Molecular & Cellular Biology, February 1999, Gene Therapy

EXTRAMURAL SERVICE

Professional : Manuscript reviewer (Ad-Hoc) since 1985 for the following journals:

Journal of Immunology
 Cellular Immunology
 Journal of Leukocyte Biology
 International Journal of Cancer
 Cancer Research
 Natural Immunity and Cell Growth Regulation
 Proceedings of the National Academy of Science
 Developmental and Comparative Immunology
 Cancer Immunology and Immunotherapy
 Gerontology
 Toxicology & Industrial Health
 Blood
 Journal of Biological Regulators and Homeostatic Agents
 Journal of Chromatography
 Biotechniques
 Associate Editor, Gene Therapy & Molecular Biology (journal) 1998-1999
 Clinical Advisory Board, Canadian J. Clinical Medicine (1997-1999)

Experimental & Clinical Immunogenetics

National/International : Reviewer (Ad-Hoc) since 1985 for:

National Science Foundation (grants)
 U.S.P.H.S. Veterans's Administration (grants)
 North Carolina Biotechnology Center (grants)
 Welcome Trust (England)
 NHLBI/NIH; R01 reviewer for cord blood grants

CONSULTING AND ADVISORY BOARDS

Teltech, Inc., Consultant, 1990-present
 Member, Board of Directors, Ageria Corporation, Tucson, AZ, 1992-present
 Member, Scientific Advisory Board, Cord Blood Registry, Inc. 1995-2001
 Consultant, Government of South Korea, Cord Blood Banking, 1997-2000
 Consultant, CryoLife, Inc, Hong Kong, China, Cord Blood Banking, 1997-2000
 Consultant, NanoTek, Inc; 1999-2000
 Member, Advisory Committee, Dr. J. Enriquez NIH grant on "Mucosal Immunity to C. parvum", Univ. Arizona, 1995-2000

Member, Scientific & Medical Advisory Board, Cryo-Cell International, Inc. 1993-1995
 Advanced Bioscience Resources, Consultant, 1994-1996.
 Applied Immune Sciences, Consultant, 1995-1996
 Medical Advisory Board, Canadian J. Clin. Med-Medical Scope Monthly, 1997-98

Chief Immunologist and Director, Odyssey Corporation, 1999-present
 Consultant, Regulon, Inc., 2000
 Consultant, Govt. of Saudi Arabia, 2000

Board of Editors, Current Drugs, 2001
 Peer Reviewer, American Institute of Biological Sciences (military)

GRANTS AND CONTRACTS

Federal:

Present

United States Air Force, Principal Investigator, "Further Investigation into the Immunotoxicology of JP-8 Jet Fuel", 10/15/97-10/14/2000, \$200,000 direct costs per year
 The long-term objective of this project is to investigate the mechanisms of JP-8 jet fuel-mediated immunotoxicity.

United States Air Force, Principal Investigator, "Capital Equipment Acquisition Grant", 8/15/99; \$9,000.

The long-term objective of this project is to purchase capital equipment for use with the above grant project.

NIH, Co-Investigator (H. Wessels, MD, Urology, PI), Gene Therapy of Diabetic Penile Endothelial Dysfunction, RO1 grant DK55017-01A1, 5 years (July 2000 to June 2005).
The long-term objective of this project is the development of a gene therapy-based treatment for erectile dysfunction.

Past

National Cancer Institute, National Institutes of Health, Principal Investigator, "Analysis of a Natural Killer Cell Antigen Receptor", 7/1/88 to 6/30/91, \$560,000 total direct costs.

National Cancer Institute, National Institutes of Health, Principal Investigator, "Analysis of a Natural Killer Cell Target Cell Antigen", 7/1/88 to 6/30/94, \$560,000 direct costs.

American Cancer Society, Principal Investigator, "Applications of Human Umbilical Cord Blood for Transplantation", 1/1/1993-12/31/1995, \$267,000 total direct costs.

United States Air Force, Principal Investigator, "Immunotoxicology of Jet Fuel Exposure", 7/1/94-10/31/95, \$150,000 total direct costs.

United States Air Force, Principal Investigator, "Further Characterization of the Immunotoxicology Effects of Exposure to Jet Fuel", 11/1/95-10/31/97, \$281,000 total direct costs.

United States Air Force, Principal Investigator, "Capital (Equipment) Acquisition Grant", 5/1/97, \$50,000

State:

Biomedical Research Support Grant (University of Arizona), Principal Investigator, "Analysis of Target Cell Antigen Involved in Natural Killer Cell Recognition", 1/1/90-12/31/90, \$10,000 total direct costs.

Biomedical Research Support Grant (University of Arizona), Principal Investigator, "Analysis of Natural Killer Cell Antigen Receptors", 10/1/90-9/30/91, \$6,000 total direct costs.

Arizona Disease Control Research Commission, Co-Principal Investigator (PI : Helen Yeoman, Ph.D.), "Umbilical Cord Blood in Hematopoietic Transplantation", 7/1/1992-6/30/1995, \$75,000 total direct costs.

Arizona Disease Control Research Commission, Co-Principal Investigator (PI : Judy Ulreich, Ph.D.), "Immunotoxicology of Ground Water Contaminants in Arizona", 7/1/1993-6/30/1996, \$138,000 total direct costs.

Arizona Elks' Research Award, Co-Principal Investigator (PI : Peter Yorgin, MD), "Development of a murine model for cord blood transplantation", 9/1/1993-8/30/1995, \$40,000 total direct costs.

Private:

Present

Cord Blood Registry, inc., "Operation of a Cord Blood Bank", 1/1/99-12/31/2003, \$800,000 per year direct costs.

The long-term objective of this project is to collect and bank cord blood samples for use in stem cell transplantation and gene therapy.

Past

Ageria Corporation, Principal Investigator, "Immunobank Program", \$1,250 direct costs, 1/1/1992-5/30/92.

Cryo-Cell International, Principal Investigator, "Stem Cell Banking", \$250,000 in equipment and \$25,000 in operations, 1993-1995.

Progenesys, Inc., Principal Investigator, "Gene Therapy of AIDS using Cord Blood", 5/1/1994-6/15/199, \$40,000 total direct costs.

Advanced Bioscience Resources, Principal Investigator, "Application of Cord Blood Gene Therapy to AIDS", 5/1/1994-6/15/1995, \$220,000 total direct costs.

Bloch Grant, Co-Principal Investigator (with Drs. Hersh and Akporiaye), "Development of a Gene Therapy Program for the Treatment of Cancer", 1/1/1994-12/31/1995, \$200,000 total direct costs.

World Medical Match Inc., Principal Investigator, "Physician education of cord blood transplantation", 10/1/1993-9/30/1994, \$43,000 total direct costs.

Vical, Co-Principal Investigator (with Drs. Hersh and Akporiaye), "Gene Therapy for Colon, Melanoma and Renal Cancer", \$209,000 total direct costs, 12/1/1994-8/15/1995.

Vical, Principal Investigator, "Gene Therapy of Malignant Melanoma in Canada", 11/1/1994-8/15/1995, \$22,750 total direct costs.

Viagene, Co-Principal Investigator (with Drs. Hersh and Akporiaye), "Gene Therapy as a Means of Immunotherapy for Cancer", reagents only, 1993-1994.

RepliGen, Co-Principal Investigator (with Drs. Hersh and Akporiaye), "Gene Therapy for the Treatment of Human Cancer", reagents only, 1993-1994.

Applied Immune Sciences, Principal Investigator, "Immune Reconstitution in Patients Undergoing T cell-Depleted Bone Marrow Transplantation", 5/15/1995-5/14/1997, \$90,000 total direct costs.

SciClone, Inc., "Effects of alpha-Thymosin on Stem Cell and T Cell Development", 11/1/96-5/30/97; \$12,500

SciClone, Inc., "Effects of In Vivo Administration of Alpha-Thymosin on Peripheral Blood Stem and T Cells", 1/1/97-12/31/97, \$23,000

Cord Blood Registry, Inc., "Cord Blood Transplants in Mice without Marrow Ablation", 1/1/97-12/31/97, \$36,000.

PENDING

United States Air Force, Principal Investigator, Further Characterization of the Immunotoxicological Effects of JP-8 Jet Fuel Exposure, 10/15/2000-10/14/2003, \$200,000 per year direct costs. The long-term objective of this project is to further investigate the mechanisms of JP-8-induced immunotoxicity.

DARPA/DOD, Co-PI, Development of a Lung Biosensor for Biological and Chemical Weapons Detection, 1999-2003, \$2,000,054 total direct costs. The long-term objective of this project is to develop a biosensor for detection of biological and chemical weapons.

Ahmad Grant, 2%, ADCRC, 2000-2002

PATENTS

1. Receptor for Natural Killer and Non-Specific Cytotoxic Cells, 1993, #5,229,494
2. Antigen Recognized by Natural Killer and Non-Specific Cytotoxic Cells, 1993, #5,185,430
3. Substance P Treatment for Immunostimulation-Cancer Therapy, 1999, #5,945,508
4. Substance P Treatment for Immunostimulation-Immunomodulation, 1999, #5,998,376
5. Computer-Based Mixed-Use Registry of Placental and Umbilical Cord Blood Stem Cells, 1999, #5,993,387.

6. Hyperthermic Inducible Expression Vectors for Gene Therapy, patent pending.
7. Gene Expression Vectors with Two Strong Promoters and Two Multiple Cloning Sites, Patent applied March 2001. (#01-068)
8. New Expression Vector that Amplifies Activity of the Inducible Heat Shock Promoter, Patent applied March 2001. (#01-067)
9. Cloning Vectors for Adapting DNA Fragments, Patent applied March 2001. (#01-070)
10. New Amplifier Gene Expression Vectors, Patent applied June 2001. (#01-066)
11. New Vectors with the Heat Shock Promoter, Patent applied June 2001. (#01-069)
12. A Novel Expression Vector Induced by Heat, Gamma-Radiation and Chemotherapy, Patent applied March 2001. (#99-039)

SOFTWARE DEVELOPMENT

1. Donor/Patient HLA Matching Software for Cord Blood Donor Foundation
2. Database and Analysis Software for Cord Blood Bank

SCHOLARLY PRESENTATIONS

Seminars:

- Invited Speaker, Department of Medical Microbiology, University of Georgia, 1985, "A Novel Function-Associated Molecule on NK Cells".
- Invited Speaker, Walter and Eliza Hall Institute, Melbourne, Australia, 1987, "A Novel Function-Associated Molecule on NK Cells".
- Invited Speaker, Department of Microbiology & Immunology, University of Arizona, 1988, "A Novel Function-Associated Molecule on NK Cells".
- Invited Speaker, California Institute of Biological Research (Stratagene), 1988, "A Novel Function-Associated Molecule on NK Cells".
- Invited Speaker, Sandoz Research Institute, Vienna, Austria, 1988, "A Novel Function-Associated Molecule on NK Cells".
- Invited Speaker, Cancer Biology Series, University of Arizona Cancer Center, Fall 1991, "A Novel Function-Associated Molecule on NK Cells".
- Invited Speaker, Cryo-Cell, Inc., Boston, MA, 1992, "Cord Blood Banking".
- Invited Speaker, Dept. of Hematology, University of Arizona, Fall 1993, "Cord Blood Banking".
- Invited Speaker, Systemix/Progenesys, Palo Alto, CA, January 1994, "Cord Blood Banking".
- Invited Speaker, Good Samaritan's Hospital, Phoenix, AZ, January 1994, "Cord Blood Banking".
- Invited Speaker, Bone Marrow Transplantation Clinical Rounds, Univ. Arizona, Feb 1994, "Cord Blood Banking".
- Invited Speaker, Dept. of Pediatrics, University of Arizona, March 1994, "Cord Blood Banking".
- Invited Speaker, Tucson Medical Center, April 1994, "Cord Blood Banking".
- Invited Speaker, Tucson Women's Health and Birth Center, April 1994, "Cord Blood Banking".
- Invited Speaker, Kino Community Hospital, October 1994, "Cord Blood Banking and Transplantation".
- Invited Speaker, AWHONN Nurses Association, November 1994, "Cord Blood Banking and Transplantation".
- Invited Speaker, Beale-Miller OB/GYN Group, January 1995, "Cord Blood Banking and Transplantation".
- Invited Speaker, Good Samaritan Regional Medical Center, Grand Rounds, Dept. OB/GYN, January 1995, "Cord Blood Banking and Transplantation".

Invited Speaker, Dept. Hematology/Oncology, Arizona Cancer Center, January 1995, "Novel Methods for Bone Marrow and Organ Transplantation"
 Invited Speaker, UMC in-service to OB/GYN and L&D staff, twice in January 1995, "Cord Blood Banking and Transplantation"
 Invited Speaker, Sandhill Management, San Diego, CA, January 1995, "Cord Blood Banking".
 Invited Speaker, Northwest and Tucson General Hospitals' Perinatal Services, February 1995, "Cord Blood Banking and Transplantation"
 Invited Speaker, "OB Days", University Medical Center sponsored conference on pregnancy, April 1995, "Cord Blood Banking and Transplantation".
 Invited Speaker, Ross Laboratories sponsored conference for pediatricians, May 1995, "Cord Blood Banking and Transplantation".
 Invited Speaker, Arizona State Nurses' Association, August 1995, "Cord Blood Banking and Transplantation".
 Invited Speaker, St. Joseph's Medical Center, Phoenix, AZ, Sept. 1995, "Cord Blood Banking and Transplantation".
 Invited Speaker, Cancer Center Biology Series, Arizona Cancer Center, Fall 1995, "Cord Blood Banking and Transplantation".
 Invited Speaker, People's Republic of China, Nanjing Medical University, Sept 25-Oct 7, 1995, "Establishment of Cord Blood Banks for Allogeneic Transplantation in China".
 Invited Speaker, Dept. Microbiology & Immunology, University of Arizona, December 1995, "Cord Blood Banking and Transplantation".
 Invited Speaker, Arlington Hospital, Washington, DC, November 3, 1995, "Cord Blood Banking, Transplantation and Gene Therapy".
 Invited Speaker, 11th Annual Perinatal Lectureship, Arlington and Alexandria Hospitals, Washington, DC, November 3, 1995, "Cord Blood Banking, Transplantation and Gene Therapy".
 Invited Speaker, Grand Rounds, Dept. OB/GYN, Stanford University, November 29, 1995, "Cord Blood Banking, Transplantation and Gene Therapy".
 Invited Speaker, Women's Birth Center, Tucson, AZ, November 7, 1995, "Cord Blood Banking and Transplantation".
 Invited Speaker, Country of Singapore, Establishing cord blood banks for transplantation, November 21-25, 1995
 Invited Speaker, Stanford (Grand Rounds, OB/GYN), Nov 29, 1995
 Invited Speaker, Cal Pacific Medical Center (Perinatal Conference), Nov 29, 1995
 Invited Speaker, Northern California OB/GYN Conference, Nov 29, 1995
 Invited Speaker, Sacramento OB/GYN conference, Dec 4, 1995
 Invited Speaker, Ontario, CA, OB/GYN conference, Nov 20, 1995
 Invited Speaker, Annual Meeting of the Arizona State Society for Medical Technology, Cord Blood Banking, 20-22 March 1996, Tucson, AZ.
 Invited Speaker, Davis-Moahan AFB, Dept. OB/GYN, in-service, Dec 4, 1995
 Invited Speaker, ASHI Southern Regional Education Workshop, Progenitor Cell Transplants, Tempe, AZ, 10-12 April 1996
 Invited Speaker, Irvine Medical Center, Irvine, CA, 23 January 1996
 Invited Speaker, Good Shepard Hospital, Chicago, IL, 25 January 1996
 Invited Speaker, Placentia Linda Medical Center, Placentia, CA, 8 February 1996
 Invited Speaker, Northwest Childbirth Educators Forum/International Childbirth Educators Association, 17 April 1996, Portland, OR
 Invited Speaker, Arizona Nurses Association/International Childbirth Educators Association, 23 February 1996, Tucson, AZ

Invited Speaker, Hoag Hospital, Orange County, CA, 15 February 1996
 Invited Speaker, St. Joseph's Hospital, Denver, CO, 8 April 1996
 Invited Speaker, Placentia Linda Hospital, Placentia, CA 7 February 1996
 Invited Speaker, Western Coast Area Coordinator Training Program for Cord Blood Collections, Santa Monica, 29 February 1996
 Invited Speaker, Bellflower Medical Center, Los Angeles, CA, 5 March 1996
 Invited Speaker, Santa Teresa Hospital (Kaiser), San Jose, CA, 12 March 1996
 Invited Speaker, Eden Medical Center, Oakland, CA, 25 March 1996
 Invited Speaker, Alexian Medical Center, Chicago, IL, 4 April 1996
 Invited Speaker, Mission Viejo Community Hospital, Mission Viejo, CA, 21 March 1996
 Invited Speaker, Eden Hospital, Oakland, CA, 25 March 1996
 Invited Speaker, Elmhurst Memorial Hospital, Chicago, IL, 5 April 1996
 Invited Speaker, Birth and Women's Health Center, Tucson, AZ, 2 April 1996
 Invited Speaker, Aurora Presbyterian Hospital, Denver, CO, 8 April 1996
 Invited Speaker, St. Joseph's Hospital, Denver, CO, 8 April 1996
 Invited Speaker, Cedar Sinai Hospital, Los Angeles, CA 10 April 1996
 Invited Speaker, Memorial Hospital Northwest, Houston, TX, 19 April 1996
 Invited Speaker, Tarzana Medical Center, 25 April 1996
 Invited Speaker, Providence St. Joseph Medical Center, Burbank, CA, 7 May 1996
 Invited Speaker, St. Jude's Hospital, Fullerton, CA, 15 May 1996
 Invited Speaker, 3rd International Cord Blood Conference, Martha's Vineyard, MA, 19-23 May 1996 (2 talks)
 Invited Speaker, Hinsdale Hospital, Chicago, IL, 30 May 1996
 Invited Speaker, Walnut Creek-Kaiser Hospital, Walnut Creek, CA, 17 Sept 1996
 Invited Speaker, Winter Haven Hospital/Regency Medical Center, Winter Haven, FL, 19 Nov 1996
 Invited Speaker, Oklahoma City, OK, OB/GYN conference, 9 July 1996
 Invited Speaker, West Anaheim Medical Center, Anaheim, CA, 2 August 1996
 Invited Speaker, Alvarado Medical Center, San Diego, CA, 6 August 1996
 Invited Speaker, Swedish Medical Center, Seattle, WA, 21 August 1996
 Invited Speaker, Verdugo Hills Hospital, USC's Community Hospital Network, Glendale, CA, 28 August 1996
 Invited Speaker, Introduction to Perinatal Frontiers, Providence Medical Center, Arlington, WA, 30 September 1996
 Invited Speaker, Tampa/St. Petersburg, FL, Bayfront Medical Center, 12 September 1996
 Invited Speaker, St. Petersburg (FL) OB conference, 13 September 1996
 Invited Speaker, Orlando, FL, AWHONN conference, "The Perinatal Hurricane", 28 October 1996
 Invited Speaker, AWHONN conference, Rolling Toward 2000, Atlantic City, NJ, 19 September 1996
 Invited Speaker, Kapiolani Medical Center, Honolulu, HI, 24 September 1996
 Invited Speaker, Kaiser Permanente Medical Center, Honolulu, HI, 25 September 1996
 Invited Speaker, Honolulu OB/GYN Meeting, Honolulu, HI, 24 September 1996
 Invited Speaker, Group Health HMO, Seattle, WA, 1 October 1996
 Invited Speaker, AWHONN conference, Eugene, OR, 3 October 1996

Invited Speaker, East Valley (Mesa) OB/GYN Society, Mesa, AZ, 11 October 1996
 Invited Speaker, Columbia Healthcare System, conference on "Stem Cell Transplantation : A New Beginning", El Paso, TX, 15 October 1996
 Invited Speaker, AWHONN Conference, Orlando, FL, 28-30 October 1996
 Invited Speaker, Boulder Community Hospital, Boulder, CO, 12 November 1996
 Invited Speaker, Regency Medical Center, Winterhaven, FL, 19 November 1996
 Invited Speaker, Medical College of Georgia, Augusta, GA, 5 December 1996
 Invited Speaker, AFOSR Conference, Dayton, OH, 12-13 December 1996
 Invited Speaker, Navy Hospital Balboa, San Diego, CA, 7 January 1997
 Invited Speaker, Parkway Medical Center, Atlanta, GA, 14 January 1997
 Invited Speaker, Atlanta OB/GYN Society, Atlanta, GA, 15 January 1997
 Invited Speaker, Arnold Palmer Cancer Center, Orlando, FL, 17 January 1997
 Invited Speaker, Orlando Regional OB's, Orlando, FL, 16 January 1997
 Invited Speaker, St. Agnes Medical Center, Fresno, CA, 27 January 1997
 Invited Speaker, Dominican Hospital, Santa Cruz, CA, 24 January 1997
 Invited Speaker, Kaiser Hospital, Newton, MA, 6 February 1997
 Invited Speaker, AFOSR Conference on JP-8, 13-14 February 1997
 Invited Speaker, Sherman Hospital, 20 February 1997, Chicago, IL
 Invited Speaker, Condell Hospital, 19 February 1997, Chicago, IL
 Invited Speaker, Mount Sinai Hospital, 19 February 1997, Chicago, IL
 Invited Speaker, Kaiser Pasadena Hospital Group, Pasadena, CA, 13 March 1997
 Invited Speaker, South Bay Perinatal, Los Angeles, CA, 13 March 1997
 Invited Speaker, Providence Seattle Medical Center, Grand Rounds, Seattle, WA 4 March 1997
 Invited Speaker, Kaiser Bellflower Hospital, Los Angeles, CA, 13 March 1997
 Invited Speaker, Scripps Memorial Hospital, San Diego, CA, 25 March 1997
 Invited Speaker, Saddleback Memorial Medical Center, Laguna Hills, CA, 8 April 1997
 Invited Speaker, Baylor University Medical Center, Dallas, TX, 16 April 1997
 Invited Speaker, Columbia Lewisville Medical Center, Dallas, TX, 16 April 1997
 Invited Speaker, National ACOG Conference, Satellite Meeting, 27 April 1997
 Invited Speaker, OB/GYN Meeting, Stamford, CT, 6 May 1997
 Invited Speaker, Piedmont Hospital, Atlanta, GA 15 May 1997
 Invited Speaker, Memorial Medical Center, Savannah, GA, 15 May 1997
 Invited Speaker, Blood and Cancer Institute of the Desert, Palm Springs, CA 16 June 1997
 Invited Speaker, St. Vincent's Hospital, Indianapolis, IN 30 July 1997
 Invited Speaker, Presbyterian Hospital-Plano, Dallas, TX, 5 August 1997
 Invited Speaker, TOPA, Inc., Dallas, TX, 5 August 1997
 Invited Speaker, Columbia West Hospital, El Paso, TX, 6 August 1997
 Invited Speaker, Columbia Sunrise Hospital, Las Vegas, NV, 14 August 1997
 Invited Speaker, Delaware Medical Center at Christiana Hospital, Wilmington, DE, 24 September 1997
 Invited Speaker, Glendale Memorial Medical Center, Glendale, CA, 29 October 1997
 Invited Speaker, Providence Medical Center, Everett, WA, 14 October 1997
 Invited Speaker, Santa Theresa-Kaiser Hospital, San Jose, CA, 21 October 1997
 Invited Speaker, North Shore Medical Center System, New York, NY, 29 October 1997
 Invited Speaker, El Camino Hospital, El Camino, CA, 11 November 1997

Invited Speaker, Peninsula Hospital, San Francisco, CA, 11 November 1997
 Invited Speaker, O'Connor Hospital, Mt. View, CA, 12 November 1997
 Invited Speaker, Hayward Kaiser Medical Center, Hayward, CA, 13 November 1997
 Invited Speaker, Sequoia Hospital, Redwood City, CA, 14 November 1997
 Invited Speaker, Alabama Hospital System (17 sites by teleconference), 17 November 1997
 Invited Speaker, Hong Kong Govt., 15 December 1997
 Invited Speaker, Providence Medical Center, Detroit, MI, 3 December 1997
 Invited Speaker, Children's Hospital of Michigan, Detroit, MI, 2 December 1997
 Invited Speaker, Univ. California-San Diego, San Diego, CA, 10 December 1997
 Invited Speaker, Kaiser-San Diego, San Diego, CA, 10 December 1997
 Invited Speaker, New York Medical Center, New York, NY, 17 December 1997
 Invited Speaker, Miami Valley Hospital, Dayton, OH, 14 January 1998
 Invited Speaker, Cincinnati OB/GYN Society, Cincinnati, OH, 14 January 1998
 Invited Speaker, Hackensack University Medical Center, Hackensack, NJ, 16 January 1998
 Invited Speaker, Fair Oaks Hospital, Fairfax, VA, 21 January 1998
 Invited Speaker, St. Agnes Medical Center, 21 January 1998
 Invited Speaker, Evanston Hospital, Evanston (Chicago), IL, 29 January 1998
 Invited Speaker, New York University Medical Center, 4 February 1998
 Invited Speaker, Long Island Jewish Medical Center, 4 February 1998
 Invited Speaker, Overlake Hospital, Seattle, WA, 11 February 1998
 Invited Speaker, Arlington Medical Center, Arlington, TX 23 February 1998
 Invited Speaker, Riverside Medical Center, Columbus, OH, 24 February 1998
 Invited Speaker, 5th International Cord Blood Conference, 10-13 October 1998, San Diego, CA
 Invited Speaker, Case Western University/Cleveland Clinic, Cleveland, OH 4 March 1998
 Invited Speaker, Allicare Managed Care/Catastrophic Case Management, Boston, MA, 11 March 1998
 Invited Speaker, Greater Baltimore Medical Center, Baltimore, MD, 13 March 1998
 Invited Speaker, Texas Women's Hospital, Houston, TX, 20 March 1998
 Invited Speaker, AFOSR Jet Fuel Conference, San Antonio, TX, 1-3 April 1998
 Invited Speaker, Memorial Sloan Kettering Hospital, Pediatric Hematology/Oncology, New York, NY, 14 May 1998
 Invited Speaker, Long Island College, Dept. OB/GYN, New York, NY, 15 May 1998
 Invited Speaker, Edwards Hospital, Naperville (Chicago), IL, 11 June 1998
 Invited Speaker, Howard County Hospital, Baltimore, MD, 25 June 1998
 Invited Speaker, Potomac Hospital, Woodbridge, VA, 26 June 1998
 Invited Speaker, Winchester Med. Ctr., Winchester, VA, 9 September 1998
 Invited Speaker, 1st Gulf Countries Blood Banking Conference, Abu Dhabi, UAE, 30 September 1998
 Invited Speaker, Georgetown Univ. Med. Ctr., Washington, DC, 14 October 1998
 Invited Speaker, Santa Monica/UCLA Med. Ctr., Santa Monica, CA, 20 October 1998
 Invited Speaker, St. Joseph Hospital, Orange, CA, 20 October 1998
 Invited Speaker, Blood and Cancer Institute, Palm Desert, CA, 16 February 1999
 Invited Speaker, Omnia Health Network, Chicago, IL, 22 February 1999
 Invited Speaker, Carolinas Connection Medical Laboratory Conference, Charleston, SC, 25 March 1999

Invited Speaker, State of Arizona Genetics Conference, Phoenix, AZ, 12 April 1999
 Invited Speaker, AFOSR JP-8 Jet Fuel Toxicology Workshop, Tucson, AZ, 11-12 January 2000
 Invited Speaker, State of Arizona Licensed Midwife Association, Phoenix & Tucson, 7 June 2001

Symposia

Minisymposium Moderator, Arizona Branch, American Society of Microbiology, 1991
 Chairman, Biomedical Sciences Section, Southwestern Region of the AAAS, 1993-1994
 Chairman, Vectors Session, Gene Therapy and Molecular Biology Conference, Crete, Greece, 17-24 August 1998
 Chairman, Transplantation Session, 1st GCC Blood Transfusion Conference, Abu Dhabi, U.A.E., 28-30 September 1998

Conferences:

Invited Speaker, Southeastern Immunology Conference, Atlanta, Georgia, 1985.
 Invited Minisymposium Speaker, Federation of American Scientists in Experimental Biology (FASEB), St. Louis, MO, 1986.
 Invited Speaker, Fourth International Workshop on Natural Killer Cells, Kingston, Ontario, Canada, 1986.
 Invited Speaker, Sixth International Congress of Immunology, Toronto, Canada, 1986.
 Invited Speaker, Southeastern Immunology Conference, Chapel Hill, N.C., 1986.
 Invited Speaker, 11th International Reticuloendothelial Society (RES) Congress, Hawaii, 1987.
 Invited Speaker, UCLA Symposia on Defense Molecules, Lake Tahoe, CA, 1989.
 Invited Minisymposium Speaker, Federation of American Scientists in Experimental Biology (FASEB), New Orleans, LA, 1989.
 Invited Speaker, International Conference on Phylogeny of Immunity, Roskoff, France, 1989.
 Invited Speaker, 6th International Natural Killer (NK) Cell Workshop, Goslar, West Germany, 1989.
 Invited Minisymposium Speaker, American Association of Immunology/American Society of Biochemistry and Molecular Biology (AAI/ASBMB) Meeting, New Orleans, LA, 1990.
 Invited Speaker, 4th International Cell-Mediated Cytotoxicity Workshop, Pittsburg, PA, 1990.
 Invited Plenary Speaker, 5th Congress of the International Society for Developmental and Comparative Immunology, Portland, Oregon, 1991.
 Invited Speaker, American Hematology Society Meeting, Denver, CO, 1991.
 Invited Speaker, International Cord Blood Transplantation Meeting, Indianapolis, IN, November 1993.
 Invited Speaker, Transplantation in the 21st Century, Tucson, AZ, April 1994
 Invited Speaker, Society for Leukocyte Biology Meeting, Sept. 1994, Tucson, AZ
 Invited Speaker, 34th ASPO/LAMAZE Annual Conference, Oct. 1994, Chicago, IL
 Invited Speaker, 3rd International Conference on Gene Therapy of Cancer, San Diego, CA, November 9-12, 1994
 Invited Speaker, Good Samaritan Regional Medical Center, Phoenix, AZ, Grand Rounds, Cord Blood Banking and Transplantation, January 1995
 Invited Speaker, Symposia on Stem Cells : Prospects for the Clinic, Palo Alto Inst. Molecular Medicine, Palo Alto, CA, February 5-6, 1995
 Invited Speaker, American Association for Cancer Research, Toronto, Canada, March 1995
 Invited Speaker, Conference on Cord Blood Stem Cells and Transplantation, Martha's Vineyard, MA, May 21-24, 1995
 Invited Speaker, "OB Days", University Medical Center sponsored conference on pregnancy, April 1995

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Invited Speaker, Ross Laboratories sponsored conference for Arizona pediatricians, Phoenix, AZ, May 1995
 Invited Speaker, Arizona State Nurses' Association, Phoenix, AZ, August 1995
 Invited Speaker, 2nd International IHSAGE Conference, Vancouver, Canada, June 1995
 Invited Speaker, Symposia on Modulators of Immune Response, Breckenridge, CO, July 1995
 Invited Speaker, 9th International Immunology Congress, San Francisco, CA July 1995
 Invited Speaker, St. Joseph's Medical Center Grand Rounds, Sept 1, 1995, Phoenix, AZ
 Invited Speaker, 4th Annual Frederick D. Curcio III Memorial Education Symposium, October 19-21, 1995, Dept. OB/GYN, Harrisburg Hospital, Harrisburg, PA.
 Invited Speaker, Cord Blood Banking and Transplantation Conference, San Francisco, CA, Oct 16-18, 1995.
 Invited Speaker, 11th Annual Perinatal Lectureship, Arlington and Alexandria Hospitals, Washington, DC, November 3, 1995, "Cord Blood Banking, Transplantation and Gene Therapy".
 Invited Speaker, Country of Singapore, Establishing cord blood banks for transplantation, November 21-25, 1995
 Invited Speaker, Annual Meeting of the Arizona State Society for Medical Technology, Cord Blood Banking, 20-22 March 1996, Tucson, AZ.
 Invited Speaker, ASHI Southern Regional Education Workshop, Progenitor Cell Transplants, Tempe, AZ, 10-12 April 1996
 Invited Speaker, Northwest Childbirth Educators Forum/International Childbirth Educators Association, 9 February 1996, Portland, OR
 Invited Speaker, Arizona Nurses Association/International Childbirth Educators Association, 23 February 1996, Tucson, AZ
 Invited Speaker, 3rd International Cord Blood Conference, Martha's Vineyard, MA, 19-23 May 1996 (2 talks)
 Invited Speaker, AWHONN Conference, Orlando, FL, 28-30 October 1996
 Invited Speaker, AFOSR Conference, Dayton, OH, 12-13 December 1996
 Invited Speaker, AFOSR Conference on JP-8, 13-14 February 1997
 Invited Speaker, Western Regional ACOG Conference, Santa Fe, NM, 16 February 1997
 Participant, Intl. Symposium & Workshop on Cord Blood Transplantation, Indianapolis, IN, 9-10 March 1997
 Invited Speaker, 5th International Symposium on Hematopoietic Stem Cell Transplantation, San Diego, CA, 10-12 April 1997
 Invited Speaker, National ACOG Conference, Satellite Meeting, 27 April 1997, Las Vegas, NV
 Invited Speaker, 4th International Cord Blood Conference, Rapallo, Italy 6-9 September 1997
 Invited Speaker, National Association of Neonatal Nurses (NANN), Phoenix, AZ, 11 September 1997
 Invited Speaker, Southern California AWHONN Society, Riverside, CA, 29 September 1997
 Invited Speaker, 36th Annual OB/GYN Fall Symposium : Current Trends in Obstetrics and Gynecology, 15-17 October 1997, Oklahoma City, OK
 Invited Speaker, Cord Blood Symposium, Hong Kong Govt., 15 December 1997
 Invited Speaker, International Conference on the Environmental Health and Safety of Jet Fuel, San Antonio, TX, 1-3 April 1998
 Invited Speaker, 5th International Cord Blood Conference, 10-13 October 1998, San Diego, CA
 Invited Speaker, 6th International Symposium on Advances in Hematopoietic Stem Cell Transplantation, Ex Vivo Workshop, San Diego, CA, 15-19 April 1998

Participant, Experts Forum on Gene Therapy and Immunotherapy, Florence, Italy, 4-9 May 1998
Participant, 1st International Gene Therapy Society Conference, Seattle, WA, 28-21 May 1998
Invited Speaker, Gene Therapy and Molecular Biology Conference, Crete, Greece, 17-24 August 1998
Invited Speaker, Annual American College of Nurse-Midwives Conference, San Francisco, CA, 22 May 1998
Participant, 5th ISHAGE Conference, Baltimore, MD, 3-7 June 1998
Invited Speaker, 1st GCC Blood Transfusion Conference, Abu Dhabi, U.A.E., 28-30 Sept 1998
Invited Speaker, JP-8 Toxicology Conference, 2-3 December 1998, Tucson, AZ
Invited Speaker, Carolinas Connection Medical Laboratory Conference, Charleston, SC, 25 March 1999
Participant, 2nd ASGT Meeting, 8-12 June 1999, Washington, DC
Participant, 6th ISHAGE Meeting, 30 May-2 June 1999, Oslo, Norway
Invited Speaker, Teleconference Network of Texas, Univ. Texas Health Science Center at San Antonio, TX, 8 September 1999
Participant, AABB ISO9000 Workshop, Orlando, FL, 22-24 September 1999
Participant, 2nd International Symposium on Molecular Medicine, Athens, Greece, 7-9 October 1999
Testimony before FTC on Cord Blood Banking and Regulation, Washington, DC, 19 May 1999.
Participant, AABB National Meeting, San Francisco, CA, 5-10 November 1999
Invited Speaker, AFOSR JP-8 Jet Fuel Toxicology Workshop, Tucson, AZ, 10-12 January 2000
Invited Speaker, International Gene Therapy & Molecular Biology Conference, Rhodes, Greece, 26-31 August 2000
Poster Presentation, American Association of Blood Banks, Washington, DC, 4-8 November 2000
Participant, Mesenchymal and Non-Hematopoietic Stem Cells, New Orleans, LA, 22-24 March 2001
Participant, FDA Meeting on cGMP, Las Vegas, NV, 4-7 April 2001

TV AND RADIO APPEARANCES

Television appearances on the following networks and shows regarding "Cord blood banking, transplantation and gene therapy":

NBC (local and national)
 CBS (local and national)
 ABC (local and national)
 PBS (local)
 Fox (local and national)
 Arizona HealthWatch (local)
 Dr. Dean Edell Medical Show (national)
 Dateline (national)
 Nightline (national)
 60 Minutes (national)
 National Public Radio (national)
 Family Channel (Home and Family Show)
 Town Meeting with Larry King
 CNN
 PBS-NOVA
 Newsweek
 ABC
 National Public Radio
 Los Angeles Times
 US News and World Report
 WGN Television, Chicago, IL
 ABC News Radio & TV-Australia
 Women's World magazine
 The Ledger (newspaper), Lakeland, FL, May 1997
 Connecticut Regional News Network, 7 May 1997
 WCXJ Radio, Pittsburg, PA, May 1997
 National Public Radio
 WTOP (radio), Washington, DC
 Ivanhoe Broadcasting (radio), Washington, DC
 Better Homes and Gardens
 Washington (DC) Times (newspaper)
 WPFW Radio, Washington, DC
 KUCI-FM Radio, Los Angeles, CA
 University of California Radio Network, Health & Science Report
 American Health Network (Universal Studios)
 Radio Health Journal, Chicago, IL
 ABC News, Baltimore, MD
 Norfolk (NE) News, NE
 Connecticut Post newspaper
 Morris Daily Herald, Chicago
 Arizona Kids Magazine (Sept 1998 issue)
 Time magazine (14 Dec 1998)
 WRTI Radio (Temple Univ.), Philadelphia, PA (Dec 1998)
 Newsday (New York, NY); January 1999
 ABC News (Phoenix, AZ), January 1999
 PBS (1999)
 National Blood Transfusion Update (February 1999)
 Arizona Republic Newspaper (Feb 1999)
 Transfusion Diagnostic Update (1999)
 Arizona Horizons (Phoenix PBS) TV Show (1999)
 Parade Magazine (1999)

Parents Magazine (1999)
 Arizona NewsWatch (1999)
 US News & World Report (1999)
 Sacramento (CA) Bee News (1999)
 Parade Magazine (1999)
 Business Journal (Phoenix), 1999
 Arizona Republic Newspaper (Phoenix), 1999
 WWOR TV (UPN), New York, NY, November 1999
 Mirabella Magazine, February 2000
 Tucson Family Magazine, April 2000
 WebMD, May 2000
 Discovery Channel Online
 CBS News-60 Minutes II (May 2001)
 WebMD, April 2001
 Channel 13 News (Tucson; May 2001, JP8)
 Desert Leaf Magazine (Tucson, May 2001)
 Radio Caracul MP, Caracul, Columbia (May 2001)
 L'Opinion (Spanish Newspaper), Los Angeles, CA (May 2001)
 Channel 13 News (CBS, Tucson, June 2001, Cord Blood)

Special stories have been written in the following journals regarding the Cord Blood Bank
 Journal of the National Cancer Institute
 Science

STUDENTS

Undergraduate Independent Studies

Marcus Christopher-1990-1991-currently in medical school at University of Arizona.
 Todd Camensich-1989 to 1992-currently a Ph.D. student at University of North Carolina.
 Jeff Kiefer-1989 to 1993-currently a Ph.D. student at M.D. Anderson, Houston, TX.
 Jeff LoCascio-1989 to 1993-currently working for Selectide, Inc., Tucson, AZ.
 Alicia Acevedo-1989 to 1992-currently in medical school at University of Arizona
 Kathleen Nelson-summer of 1993-Navajo Community College student through the
 Howard Hughes Undergraduate Biology Bridge Program-currently a nursing
 student at Northern Arizona University.
 Joslyn Hundley-Pima Community College-1994-applying to medical school
 Maria Diaz-Pima Community College Outreach Program, 1994-currently at student at
 University of Arizona
 Ophelia Spencer-Navajo Community College Outreach Program, 1994.
 Dayln Ellison-1994-1996
 Joy Eachus-1994-1995
 Eric Szeto, 1995-1996, applying to medical school
 Elaine Lakey, 1995-1996, Biology Bridge Program, nursing student at Pima Community
 College
 Christy Lyons, 1995-1996, Undergraduate Biology Research Program student
 Rita Chu, 1995, currently applying to medical school
 Suzi Brett, 1996-present
 Marc Friedman, 1997-1999

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Cindy Takeuchi, UBRP, 1998 & 1999 & 2000; Senior Honors Thesis
Dominic Titone, UBRP, 1998 & 1999 & 2000; Senior Honors Thesis
Joe Dekker, Biochemistry Honors, 2000-present
Michael Badowski, Biochemistry Honors, 2000-present
Jennifer Meston, 2000-present
Jimmy Duncan, Pima Community College, Spring 2001-present
Jennifer, MARC Program, Summer 2001

Ph.D. Thesis Committees**Present**

Farha Vasanwala-Dept Microbiology & Immunology (my current graduate student)
 Phoebe Luo Lihong, Dept. Microbiology & Immunology (my current graduate student)
 Tong Zhang, Dept. Microbiology & Immunology (my current graduate student)
 Brian Pipes, Dept. Microbiology & Immunology (my current graduate student)
 Xiaolei Tang, Dept. Microbiology & Immunology (D. Yocum, advisor)

Past

Reuben Kapur, Dept. Microbiology & Immunology-postdoctoral fellow at Indiana University Medical School (my former graduate student).
 Val Hohman, Dept. Microbiology & Immunology-postdoctoral fellow at MIT
 Kathy Berlyn, Dept. Microbiology & Immunology-postdoctoral fellow at NIH
 Virginia Guptill, Dept. Microbiology & Immunology-postdoctoral fellow at NIH
 Hua Zhang, Dept. Microbiology & Immunology-currently doing postdoctoral work.
 Greg Johansen, Dept. Microbiology & Immunology
 Robert Kurt, Dept. Microbiology & Immunology, Asst. Prof., Oregon Health Sciences University

Postdoctoral and Other Fellows:**Present**

Tom Tsang, Ph.D. (1994-1996), currently a Senior Research Scientist with me
 Dr. Shu-Xin Peng, MD, Pediatrics, China, 1998-2000
 Tom's Sister, Summer 2001???

Past

Sindy Rychlik, PhD (1991-1993).
 Helen Yeoman, PhD (1991-1993). Currently employed by Selectide, Inc., Tucson, AZ.
 Peter Yorgin, M.D. (1992-1995) Pediatrics, University of Arizona.
 Sheng Ruilan, M.D., (1996), Director of Pediatric Hematology, Nanjing Medical University, PR of China
 Bolun Yuan, M.D. (1996), Director of Pediatric Hematology, China-Japan Friendship Hospital, PR of China
 Zhongde Jin, M.D. (1996), Professor of Pediatrics, Jinhua Municipal Central Hospital, PR of China
 Jenny Ngai, Singapore Blood Bank, Singapore, February-March 1997
 Dr. W. Du, MD, Jinhua, China, April-Oct 1997
 Ma. Phang Yen, Singapore Blood Bank, Singapore, September-November 1997
 Dr. Jung Kim, LifeCord Cord Blood Bank, Seoul, South Korea, Jan/Feb 1998

COURSES TAUGHT

Cellular Immunology (formerly Immunobiology, MICR 561), Course Organizer and Sole Instructor, Dept. Microbiology & Immunology, Spring Semesters, 1991, 1993, 1995, 1998 and 2000.

Graduate Student Seminar Program (Micro 696), Dept. Microbiology & Immunology, 1990-1993.

Immunology Colloquim, Current Topics in Immunology (Micro 695A), Dept. Microbiology & Immunology, Spring Semester, 1990.

Immunology Colloquim, Immunopathology (Micro 695B), Dept. Microbiology & Immunology, Fall Semester, 1990.

Advanced Immunology & Microbiology Techniques (Micro 630), Dept. Microbiology & Immunology, Spring 1992.

Developmental Immunology (Micro 560, formerly Immunoglobulins), Dept. Microbiology & Immunology, Spring 1992

Tumor Immunology (MICR 562X), Dept. Microbiology & Immunology, Fall 1992 and 1994.

Immunology Journal Club-every semester, 1990-1993.

Departmental Graduate Student Research/Data Forum-every semester, 1990-1993.

Medical Microbiology & Immunology, MBIM#501, every fall semester, 1990-2000.